

New Horizons power is INL first

It can barely power two 100-watt household light bulbs, yet the Idaho National Laboratory's space battery is powering NASA's New Horizons mission to Pluto. The space battery is called a radioisotope thermoelectric generator, or RTG. Though small, it increases INL's role in space programs.

The grand piano-sized probe will travel 2.9 billion miles and will be more than nine years en route in search of answers to questions about Plutonian and Kuiper Belt origins and composition.

The RTG weighs only 127 pounds and was launched with the probe in January. After Lockheed Martin's Atlas V rocket-aided takeoff, the craft's only power will come from the RTG. The RTG was the first assembled at the INL's new 10,000-square-foot Space and Security Power Systems Facility, or SSPSF.

The facility, located 50 miles west of Idaho Falls, is the nation's new leader in terms of RTG research and development. INL scientists and engineers built the new facility in 2004, and completed Idaho's first RTG in just nine months.

"To finally see it integrated to the spacecraft was quite a surreal moment. It was a great time to reflect on all of the accomplishments we have made in the past three years that I have been involved in this program. I am very proud to be a part of such a dedicated team," said Kelly Lively, one of the electrical engineers assigned to building the facility who remained for the RTG project.

The segue into the new leadership role began in 2003, when the Department of Energy's RTG lab was moved from Mound, Ohio, to Idaho Falls. The success thus far brought another assignment with it. DOE has placed another order. The next job is for Multi-Mission RTGs. Lively was also assigned as the assistant project manager for this assignment.

Lively and Stephen Johnson, the RTG project manager, have already begun modifications for test and assembly equipment to accommodate the new project. The first mission is slated for September 2009. It will power a scientific land rover to Mars.

"It brings a tear to my eye just thinking about [the first RTG]. I think I'm in post-launch depression," said Lively with a light laugh. "I could not be more proud of the crew that actually supported the integration, not to mention my co-workers who were actually involved in the assembling and testing of the RTG."

Major contributions came from two other Department of Energy national laboratories in Oak Ridge, Tenn., and Los Alamos, N.M. The labs helped refine and safely encapsulate the plutonium before its energy could be harnessed and used.

Though RTGs are a new frontier for INL, NASA has used them for almost 40 years in 25 missions. New Horizons carried 24 pounds of plutonium-238, an isotope pelletized into ceramic form and encapsulated. The heat from the radioactive decay of the plutonium is converted to electricity, which powers the craft's instruments.

However, New Horizons will have a helping hand along the way. When the craft reaches Jupiter in February 2007, it will fly close enough for a gravity assist. It will spur New Horizons to roughly 36,000 miles per hour (about 50,000 kilometers per hour). The help from Jupiter could cut as much as 5 years off the travel time. The anticipated arrival date is July 2015.

"This launch is a huge accomplishment for the Department of Energy, state of Idaho and our INL family," said Johnson. "Workers will be able to look back 10 years from now when images are being received from the first mission to the last planet and say to their grandchildren, 'I built that right here in Idaho.'"

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